

Direction of the Chlorination and Bromination
of Phenyl Silanes Containing SiF_3 and
 $\text{Si}(\text{OH})_3$ Groups

82043
S/062/60/000/02/06/012
B003/B066

to the ionic mechanism. There are 1 figure, 1 table, and 8 references:
4 Soviet and 4 American.

ASSOCIATION: Institut organicheskoy khimii im. M. D. Zelinskogo Akademii
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SUBMITTED: July 12, 1958 (initially)
November 21, 1959 (after revision)

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Card 3/3

05603

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S/062/60/000/006/022/025/XX
B020/B060

AUTHORS: Ponomarenko, V. A., Yegorov, Yu. P.
TITLE: Vibration Frequencies of Si - H and Si - D Bonds¹ and
Electronegativity of Silyl Groups
PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk,
1960, No. 6, pp. 1133-1135

TEXT: In a number of previous papers (Refs. 1 - 4) the authors have already established the dependence of the vibration frequencies of the Si - H and Si - D bonds on the nature of atoms and groups bound to silicon. There is no precise relationship between the vibration frequencies of Si - H bonds and the sum of electronegativities. Better results are obtained by making use of electronegativities of groups, determined from the vibration frequencies (Ref. 6). However, as may be seen from Table 1, the empirical relation developed also holds for silicon hydrides. If the data obtained are recorded in a diagram, a straight line is obtained, whose equation reads: $\nu_{\text{Si-H}} = 1011.X_c$ (1).

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Vibration Frequencies of Si - H and Si - D
Bonds and Electronegativity of Silyl Groups

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This equation serves for calculating the mean values of the electronegativities of the silyl groups on the basis of the values indicated in Table 1. The same equation can also be used to calculate the vibration frequencies of Si - H bonds in other silicon hydrides, if the electronegativities of the silyl groups are known. The "effective" electronegativity of an arbitrary silyl group containing given atoms or organic groups can be determined from the data indicated in the Table, and hence, the desired vibration frequency of the Si - H bond by substituting into equation (1). This is clearly indicated by the data given in Table 2. For silicon deuterides the equation reads:
 $\nu_{\text{Si} - \text{D}} = 734 \cdot X_e$. For hydrides and deuterides of germanium the same relation holds on principle, the coefficients only being different. There are 2 tables and 10 references: 5 Soviet, 3 US, 1 British, and 1 French.

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85603

Vibration Frequencies of Si - H and Si - D
Bonds and Electronegativity of Silyl Groups

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87119

S/062/60/000/009/005/021
B023/B064

54130 1273, 1266, 2209

AUTHOR:

Yegorov, Yu. P.

TITLE:

Effect of the Structure of Substituents on the Silicon Atom
Upon the Frequency of the Symmetrical Vibration Si - C in
Spectra of Organosilicon Compound

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh
nauk, 1960, No. 9, pp. 1553-1559

TEXT: In previous papers the author found that alkyl- and alkenyl radicals, bound to the silicon atom, exert only little mutual influence (Refs. 1-3). The Si atom prevents interaction. The relation between the structure of the radical and the frequency of the symmetrical vibration $\nu(\text{Si} - \text{C})$ is discussed here. On the basis of a comparison of the published data with his results, the author arrives at the conclusion that the symmetrical frequency $\nu(\text{Si} - \text{C})$ covers the range 500-700 cm^{-1} . This frequency can be easily identified in the spectrum since it is intensive and polarized. The form of the normal vibration, corresponding to the given frequency, is linked with the maximum change of the polarizability

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Effect of the Structure of Substituents on the Silicon Atom Upon the Frequency of the Symmetrical Vibration Si - C in Spectra of Organosilicon Compounds

S/062/60/000/009/005/021
B023/B064

ellipsoid of $C_{(3)} - \overset{C_{(1)}}{\underset{C_{(2)}}{\text{Si}}} - C_{(2)}$. This pulsating vibration causes a simultaneous change of all Si - C bonds. The substitution of a radical for a radical of different structure causes a new distribution of the electron density on the shell of the Si atom, which, in turn, affects the frequency of the symmetrical vibration. It was experimentally confirmed that the stronger electronegative radicals increase the frequency $\nu(\text{Si} - \text{C})$, the weaker electronegative ones reduce it. Fig. 1 shows the dependence of the radical structure on the magnitude of the frequency. The author introduces a technical term already known in literature, and defines it. "eff.EN" (effective electronegativity) is a quantitative expression for the overall effect upon the electron shell of the Si atom, causing a change of the elastic Si - C bonds. The sums of the eff.EN of the radicals bound to the Si atom can be seen on the abscissa of Fig. 1, the frequencies $\nu(\text{Si} - \text{C})$ on the axis of ordinates. This relation can be well expressed by the

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Effect of the Structure of Substituents on the
Silicon Atom Upon the Frequency of the
Symmetrical Vibration Si - C in Spectra of
Organosilicon Compounds

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formula $\nu = 1655 / \sqrt{15.77 - \Sigma e_i}$ (1), where ν is the frequency of the
symmetrical stretching vibration $\nu(\text{Si} - \text{C})$ in cm^{-1} ; Σe_i is the sum of the
eff.EN of 4 substituents on the Si atom. This formula does not only hold
for methyl chloro silane, but also other groups of organosilicon compounds,
which are compiled in Tables 2 and 3. Fig. 1 shows that the dependence
between the structure of the radical and magnitude of its eff.EN has a
rather complex character. The authors introduced a correcting term into
formula (1), which takes account of the interaction between the allyl
groups, and obtained the modified formula $\nu = 1655 / \sqrt{15.77 - [\Sigma e_i + 0.77(n-1)]}$ (2)

The data of Table 3 are computed on the basis of this formula. On the basis
of the quantitative characteristic of the properties of radicals it is,
in the authors' opinion, easy to determine the nature of the intramolecular
interaction of the Si atom and the laws of the chemical structure. There
are 1 figure, 3 tables, and 23 references: 8 Soviet, 10 US, 2 British,
2 German; and 1 Czechoslovakian.

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Effect of the Structure of Substituents on the
Silicon Atom Upon the Frequency of the
Symmetrical Vibration Si.-C in Spectra of
Organosilicon Compounds

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B023/B064

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii
nauk SSSR (Institute of Organic Chemistry imeni N. D.
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SUBMITTED: March 2, 1959

Legend to Tables 2 and 3: 1) reference; 2) ν_{experim} ; 3) ν_{calc}

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Таблица 2

Frequenz
Частоты $\nu(\text{Si}-\text{C})$, полученные из опыта и вычислений

Соединение	Лит. ссылка	$\Sigma \nu_i$	$\nu_{\text{ср}}^1$	$\nu_{\text{ср}}^2$	Δ
$(\text{CH}_3)_3\text{SiCl}_2$	[10]	11	759*	—	—
$(\text{CH}_3)_2\text{SiCl}_2$	[10]	10	690*	—	—
$(\text{CH}_3)_3\text{SiCl}$	[10]	9	636	636	0
$(\text{CH}_3)_4\text{Si}$	[10]	8	595	594	-1
$(\text{C}_2\text{H}_5)_4\text{Si}$	[19]	6,68	553*	549	-4
$(\text{C}_2\text{H}_5)_3\text{Si}$	[10]	7,01	559*	559	0
$(\text{CH}_3)_3\text{Si}(\text{C}_2\text{H}_5)_2$	[19]	7,34	508	570	2
$(\text{CH}_3)_2\text{Si}(\text{C}_2\text{H}_5)_3$	[19]	7,67	580	582	+2
$(\text{CH}_3)_2\text{SiC}_2\text{H}_5$		7,72	584*	—	—
$\text{Si}(\text{CH}=\text{CH}_2)_4$		7,93	588	591	+3
$(\text{CH}_3)_2\text{SiCH}=\text{CH}_2$		6,94	556	557	-1
$(\text{C}_2\text{H}_5)_2\text{SiCH}=\text{CH}_2$		8,58	617*	—	—
$(\text{CH}_3)_2\text{SiC}_6\text{H}_5$		7,59	580	579	-1
$(\text{C}_2\text{H}_5)_2\text{SiC}_6\text{H}_5$		9,58	660	665	+5
$(\text{CH}_3)_2\text{C}_6\text{H}_5(\text{SiCl})$					

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$(\text{CH}_3)_2\text{Si}(\text{C}_2\text{H}_5)(\text{C}_6\text{H}_5)$	[20]	8,25	605	604	-1
$(n\text{-C}_8\text{H}_{17})_2\text{Si}$		8,0	591	594	+3
$(\text{CH}_3)_2\text{Si}(n\text{-C}_2\text{H}_5)$		8,0	602	594	-8
$(n\text{-C}_7\text{H}_{15})_2\text{SiCH}=\text{CH}_2$	[20]	7,03	590	591	+1
$(n\text{-C}_8\text{H}_{17})_2\text{Si}$		8	594	594	0
$(n\text{-C}_8\text{H}_{17})\text{Si}(\text{C}_2\text{H}_5)_2$		7,01	568	559	-9
$(n\text{-C}_8\text{H}_{17})\text{SiCH}=\text{CH}_2$		7,93	588	591	+3
$(\text{CH}_3)_2\text{SiCH}_2\text{CH}_2\text{CH}=\text{CH}_2$		7,85	588*	—	—
$(\text{CH}_3)_2(\text{C}_2\text{H}_5)\text{SiCH}_2\text{CH}_2\text{CH}=\text{CH}_2$		7,52	579	576	-3
$(\text{C}_2\text{H}_5)_2\text{SiCH}_2\text{CH}_2\text{CH}=\text{CH}_2$		0,86	550	555	-1
$(\text{CH}_3)_2\text{SiCH}=\text{C}(\text{CH}_3)_2$		8,53	615*	—	—
$(\text{CH}_3)_2\text{Si}[\text{CH}=\text{C}(\text{CH}_3)_2]_2$		9,06	650	639	-11
$(\text{CH}_3)_2(\text{C}_2\text{H}_5)\text{Si}-\text{CH}=\text{C}(\text{CH}_3)_2$		8,20	602	602	0
$(\text{CH}_3)_2\text{Si}\begin{cases} \text{CH}_2-\text{CH}_2 \\ \text{CH}_2-\text{CH}_2 \end{cases}$		8,12	598	598	0
$(\text{C}_2\text{H}_5)_2\text{Si}\begin{cases} \text{CH}_2-\text{CH}_2 \\ \text{CH}_2-\text{CH}_2 \end{cases}$		7,46	582	574	-8

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$\begin{array}{c} \text{H}_2\text{C}-\text{H}_2\text{C} \\ \text{H}_2\text{C}-\text{H}_2\text{C} \end{array} \begin{array}{c} \diagup \\ \diagdown \end{array} \begin{array}{c} \text{CH}_2-\text{CH}_2 \\ \text{CH}_2-\text{CH}_2 \end{array} \text{Si} \begin{array}{c} \diagdown \\ \diagup \end{array} \begin{array}{c} \text{CH}_2-\text{CH}_2 \\ \text{CH}_2-\text{CH}_2 \end{array}$	8,24	603*	603	0
$(\text{n-C}_4\text{H}_9)_2\text{Si} \begin{array}{c} \diagdown \\ \diagup \end{array} \begin{array}{c} \text{CH}_2-\text{CH}_2 \\ \text{CH}_2-\text{CH}_2 \end{array}$	8,12	601	508	-3
$(\text{CH}_3)_2\text{SiCH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}=\text{CH}_2^*$	8,20	602*	—	—
$(\text{C}_2\text{H}_5)_2\text{SiCH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}=\text{CH}_2$	7,21	567	566	-1
$(\text{CH}_3)_2\text{SiCH}_2\text{C}_6\text{H}_5^*$	8,29	605*	—	—
$(\text{C}_2\text{H}_5)_2\text{SiCH}_2\text{C}_6\text{H}_5$	7,30	570	569	-1
$(\text{CH}_3)_2\text{SiCH}_2\text{CH}_2\text{C}_6\text{H}_5^*$	8,53	615*	—	—
$(\text{C}_2\text{H}_5)_2\text{SiCH}_2\text{CH}_2\text{C}_6\text{H}_5$	7,54	590	577	-13

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77855
SOV/79-30-2-6/78

AUTHORS: Petrov, A. D., Chernyshev, Ye. A., Dolgaya, M. Ye.,
Yegorov, Yu. P., Leytes, L. A.

TITLE: Addition of Silanes to Alkenylbenzenes in the Presence
of Chloroplatinic Acid

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 2, pp 376-
383 (USSR)

ABSTRACT: The authors effected addition of trichlorosilane and
alkyldichlorosilanes to styrene, allylbenzene, and γ -
butenylbenzene by using chloroplatinic acid as a
catalyst (1 ml of 0.1 M solution in isopropyl alcohol
per 1.2 mole each of silane and alkenylbenzene. The
reaction was performed at 30-40°, in a four-neck round-
bottom flask, provided with a stirrer, reflux condenser,
thermometer, and a dropping funnel (for slow and con-
tinuous addition of the alkenylbenzene). While addi-
tion of trichlorosilane results in only one product,
the methyl- and ethyldichlorosilanes produce two isomers
each:

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Addition of Silanes to Alkenylbenzenes in
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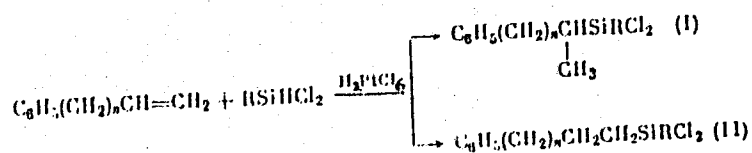
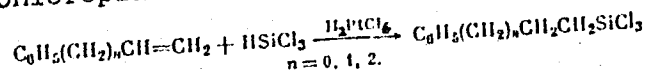


Table A lists the synthesized compounds and their properties. The reaction of obtained compounds with $MgCH_3Br$ and $MgCH_3CH_2Br$ led to formation of trialkylphenylalkylsilanes: δ -phenylbutyltrimethylsilane (bp $91-92^\circ$ (3 mm), n_D^{20} 1.4828, d_4^{20} 0.8656); γ -phenylpropyltrimethylsilane (bp 56° (2 mm), n_D^{20} 1.4853, d_4^{20} 0.8684); γ -phenylpropyltriethylsilane (bp 165° (20 mm), n_D^{20} 1.4949, d_4^{20} 0.8939); δ -

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Table A.

1	2	3	4	5	n_D^{20}	d_4^{20}	M_R		6 η				8	7 η			
							6	7	c	н	я	a		c	н	я	a
HSiCl ₃	$C_4H_7CH=CH_2$	$C_4H_7CH_2CH_2SiCl_3$ 9	61.8	7.9 (2.5)	1.5184	1.2386	58.59	58.01	-	-	-	-	$C_4H_7SiCl_3$	-	-	-	-
HSiCl ₃	$C_4H_7CH_2CH=CH_2$	$C_4H_7CH_2CH_2CH_2SiCl_3$ 10	42.4	110 (10)	1.5140	1.2239	62.62	62.67	42.55	4.33	11.13	41.66	$C_4H_7SiCl_3$	42.62	4.33	11.06	41.97
HSiCl ₃	$C_4H_7CH_2CH_2CH=CH_2$	$C_4H_7CH_2CH_2CH_2CH_2SiCl_3$ 11	24.3	117 (6)	1.5114	1.1957	67.01	67.30	-	-	-	-	$C_4H_7SiCl_3$	-	-	-	-
		$C_4H_7CHSiCH_2CH_2$ 12	12.9	61 (2)	1.5183	1.1301	58.14	58.11	-	-	-	-	$C_4H_7SiCl_3$	-	-	-	-
CH ₃ SiHCl ₂	$C_4H_7CH=CH_2$	$C_4H_7CH_2CH_2SiCl_2CH_3$ 13	50.0	69 (2)	1.5120	1.1311	58.10	58.11	-	-	-	-	$C_4H_7SiCl_3$	-	-	-	-
		$C_4H_7CH_2CHSiCH_2CH_3$ 14	7.5	101.5 (9)	1.5152	1.1165	62.78	63.01	-	-	-	-	$C_4H_7SiCl_3$	-	-	-	-
CH ₃ SiHCl ₂	$C_4H_7CH_2CH=CH_2$	$C_4H_7CH_2CH_2CH_2SiCl_2CH_3$ 15	50	112.5 (9)	1.5102	1.1090	62.83	63.01	-	-	-	-	$C_4H_7SiCl_3$	-	-	-	-

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Table A. (Cont'd.)

$C_8H_{11}SiCl_3$	$C_8H_9Cl_2CH=CH_2$	$C_8H_9CH_2CH_2CH_2SiCl_2CH_3$ 16	8.7	111.5 (8)	1.5124	1.0970	67.81	67.67	53.51, 53.36	6.45, 6.50	11.19, 11.30	28.65, 28.50	$C_{11}H_{16}SiCl_2$	53.46	6.47	11.34	28.71
		$C_8H_9CH_2CH_2CH_2CH_2SiCl_2CH_3$ 17	61.9	129-130 (10)	1.5087	1.0925	67.25	67.47	51.59, 53.63	6.37, 6.36	11.29, 11.36	28.79, 28.39	$C_{11}H_{16}SiCl_2$	53.46	6.47	11.34	28.71
$C_8H_9SiHCl_2$	$C_8H_7CH=CH_2$	$C_8H_7CHSiCl_2C_2H_5$ 18	16.3	98.97	1.5160	1.1218	62.73	63.04	51.55, 51.71	6.01, 6.07	12.29, 12.12	30.27, 30.17	$C_{10}H_{14}SiCl_2$	51.52	6.01	12.02	30.44
		$C_8H_7CH_2CH_2SiCl_2C_2H_5$ 19	40.3	106 (4)	1.5095	1.1149	62.45	63.04	52.11, 52.30	6.16, 6.15	11.27, 11.17	29.65, 29.55	$C_{10}H_{14}SiCl_2$	51.52	6.01	12.02	30.44
$C_8H_9SiHCl_2$	$C_8H_7CH_2CH=CH_2$	$C_8H_7CH_2CHSiCl_2C_2H_5$ 20	8.0	105 (5)	1.5100	1.1000	67.11	67.67	51.64, 51.90	6.44, 6.35	11.61, 11.55	28.83, 28.59	$C_{11}H_{16}SiCl_2$	51.46	6.47	11.34	27.71
		$C_8H_7CH_2CH_2CH_2SiCl_2C_2H_5$ 21	57.0	114 (5)	1.5103	1.0997	67.23	67.67	—	—	—	—	$C_{11}H_{16}SiH$	—	—	—	—
$C_8H_9SiHCl_2$	$C_8H_7SiH_2CH=CH_2$	$C_8H_7CH_2CH_2CH_2SiCl_2C_2H_5$ 22	9.2	124 (7)	1.5135	1.0893	72.16	72.30	55.21, 55.33	6.78, 6.89	10.17, 10.14	26.98, 27.16	$C_{11}H_{16}SiCl_2$	55.19	6.89	10.73	26.79
		$C_8H_7CH_2CH_2CH_2CH_2SiCl_2C_2H_5$ 23	61.0	147.5 (6)	1.5078	1.0837	71.79	72.30	55.27, 55.32	6.89, 6.93	10.47, 10.50	27.45, 27.30	$C_{11}H_{16}SiCl_2$	55.19	6.89	10.73	26.79

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Addition of Silanes to Alkenylbenzenes in
the Presence of Chloroplatinic Acid

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Key to Table A: (1) Chlorosilane; (2) aromatic compound;
(3) synthesized compound; (4) yield based on chloro-
silane (in %); (5) boiling point (pressure in mm); (6)
found; (7) calculated; (8) empirical formula; (9) β -
phenylethyltrichlorosilane; (10) γ -phenylpropyltri-
chlorosilane; (11) δ -phenylbutyltrichlorosilane; (12)
 α , α -phenylmethylmethylmethyldichlorosilane; (13) β -
phenylethylmethyldichlorosilane; (14) α , α -methyl-
benzylmethyldichlorosilane; (15) γ -phenylpropylmethyl-
dichlorosilane; (16) α , α -Methyl- β -phenylethylmethyl-
dichlorosilane; (17) δ -phenylbutylmethyldichlorosilane;
(18) α , α -methylphenylethyldichlorosilane (19) β -
phenylethylethyldichlorosilane; (20) α , α -methylben-
zylethyldichlorosilane; (21) γ -phenylpropylethyl-
dichlorosilane; (22) α , α -methyl- β -phenylethyl-
dichlorosilane; (23) δ -phenylbutylethyldichlorosilane.

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Additon of Silanes to Alkenylbenzenes in
the Presence of Chloroplatinic Acid

77855

SOV/79-30-2-6/78

phenylbutyltriethylsilane (bp 106° (2 mm), n_D^{20} 1.4922, d_4^{20} 0.8862). Raman spectra of all the listed compounds (and 4 other derivatives) were taken. The spectra of alkenylbenzenes with straight ($\geq S_1(CH_2)_n C_6H_5$, $n = 1, 2, 3, 4$) and branched ($\geq SiCH(CH_3)(CH_2)_n C_6H_5$, $n = 0, 1, 2$) chains show a marked difference which can help differentiate between the two types. The compounds containing straight chain alkyl groups have two lines ($\sim 1,185$ and $\sim 1,207$ cm^{-1}) in the region 1,180-1,210 cm^{-1} , whose frequency and intensity do not depend upon the length of the chain. The compounds of the second type show only one line in this region, whose frequency and intensity depend upon the value of n . Increase in n lowers the frequency and raises the intensity of the line. There are 1 table; and 7 references, 2 Soviet, 1 Japanese, 4 U.S. The U.S. references are: C. A. Burkhard, R. H. Krieble, J. Am. Chem. Soc., 69, 2687 (1947); Ch. A., 49, 14377 (1955); G. H. Wagner,

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Addition of Silanes to Alkenylbenzenes in
the Presence of Chloroplatinic Acid

77855
SOV/79-30-2-6/78

D. L. Bailey, A. N. Pines, et al., Ind. Eng. Ch., 45,
367 (1953); J. H. Speier, J. A. Webster, G. Barnes,
J. Am. Chem. Soc., 79, 974 (1957).

ASSOCIATION:

Institute of Organic Chemistry of the Academy of Sciences,
USSR (Institut organicheskoy khimii Akademii nauk SSSR)

SUBMITTED:

March 2, 1959

Card 7/7

S/079/60/030/008/004/008
B004/B064

AUTHORS: Durgar'yan, S. G., Yegorov, Yu. P., Nametkin, N. S.,
Topchiyev, A. V.

TITLE: Determination of the Structure of a Series of Organo-
silicon Compounds Obtained by Adding Trichlorosilane to
Mono- and Diallyl Derivatives of Silicon by Infrared
Spectroscopy

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 8,
pp. 2600 - 2608

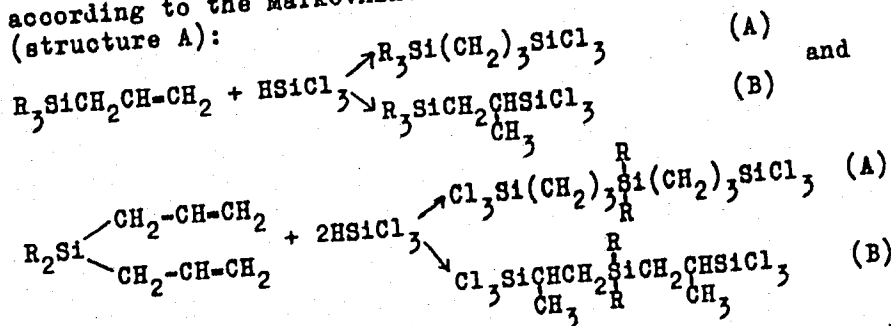
TEXT: The following compounds were investigated (Table 1):
 $R_3Si(CH_2)_3SiR_3$, where $R = CH_3, C_2H_5, C_3H_7, C_4H_9, C_6H_5$, and Cl ;
 $(CH_3)_3Si(CH_2)_3SiR_3$; $R_2Si[(CH_2)_3SiR_3]_2$; $(CH_3)_2Si[(CH_2)_3SiR_3]_2$;
 $C_6H_5(CH_3)Si[(CH_2)_3Si(CH_3)_3]_2$; $C_6H_5(CH_3)Si[(CH_2)_3Si(C_6H_5)_3]_2$, and
 $(C_6H_5)_2Si[(CH_2)_3Si(CH_3)_3]_2$. These compounds were obtained by adding
 $HSiCl_3$ to mono- and diallyl derivatives of silicon using benzoyl

Card 1/3

Determination of the Structure of a Series of
Organosilicon Compounds Obtained by Adding
Trichlorosilane to Mono- and Diallyl Derivatives
of Silicon by Infrared Spectroscopy

S/079/60/030/008/004/008
B004/B064

peroxide, platinum on coal or platinum hydrochloric acid as catalyst.
It was the aim of this paper to find whether the addition takes place
according to the Markovnikov rule (structure B) or against this rule
(structure A):



The infrared spectra were recorded with a MKC-12 (IKS-12) spectrometer
in the range of 700 - 1700 cm⁻¹ and 2800 - 3000 cm⁻¹. Table 2 shows the

Card 2/3

Determination of the Structure of a Series of Organosilicon Compounds Obtained by Adding Trichlorosilane to Mono- and Diallyl Derivatives of Silicon by Infrared Spectroscopy S/079/60/030/008/004/008 B004/B064

intensities of the 2952 cm^{-1} peak and the CH_3 group. The number of CH_3 groups calculated herefrom corresponds to structure A. The same holds for the intensity of the 2912 cm^{-1} peak of the CH_2 group (Table 3).

Characteristic bands are found at about 900 and between $1135\text{--}1140\text{ cm}^{-1}$ in the range of $700\text{--}1700\text{ cm}^{-1}$ (Fig.), which are ascribed to group $\text{SiCH}_2\text{CH}_2\text{CH}_2\text{Si}$ and also confirm structure A. Table 4 shows, with reference to published data, the characteristic frequencies of the radicals bound to the silicon atom, and the spectra in which the authors found these frequencies. Graphs are given of 21 spectra. There are 22 figures, 4 tables, and 4 references: 1 Soviet, 2 US, and 1 British.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petroleum-chemical Synthesis of the
Academy of Sciences USSR)

SUBMITTED: August 31, 1959

Card 3/3

S/076/60/034/04/31/042
B010/B009

AUTHORS: Yegorov, Yu. P., Romadan, I. A., Shlyapochnikov, V. A.,
Shaykin, N. I. (Moscow)

TITLE: Investigation of the Structure of the Radicals of Substances
Obtained by Alkylation of Aromatic Hydrocarbons by Means of
Alcohols in the Presence of Boron Trifluoride

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 4, pp. 888 - 893

TEXT: In a number of earlier papers (Refs. 1-6) I. A. Romadan described a method for the alkylation of aromatic hydrocarbons with molecular alcohol compounds of boron trifluoride at 165-170° in an autoclave, or at a pressure of 1 atmosphere. The results obtained do not agree with those given by other authors, and it is assumed that a different reaction mechanism prevails under such conditions (without activator and at 165-170°). For instance, in the alkylation of naphthalene with n-butyl, n-amyl, and n-propyl alcohol alkyl naphthalenes with normal radicals were obtained. The structure of n-butyl naphthalene was confirmed spectroscopically (Ref. 13) and by a special method of deuterium exchange at the fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute imeni L. Ya. Karpov) in the

Card 1/2

Investigation of the Structure of the Radicals of S/076/60/034/04/31/042
Substances Obtained by Alkylation of Aromatic Hydro- B010/B009
carbons by Means of Alcohols in the Presence of Boron Trifluoride

laboratory of A. I. Shatenshteyn. The reaction mechanism can hardly be explained by means of the data concerning the alkylation with iso-alcohols; however, the reaction might take place via an intermediate stage during which olefines are formed. The structure of the alkylation products obtained was determined from infrared spectra; particular attention was paid to the structure of the side chain, which was investigated on the basis of the frequency of CH oscillations ($2800-3000\text{ cm}^{-1}$). The spectra of the alkyl naphthalenes and diphenyls (Figs. 1,2), the constants of which are given in a table, were recorded by means of an IKS-11 infrared spectrometer with the aid of an FEOU-15 amplifier. The assumption was confirmed that there is a weak interaction between the alkyl radicals and aromatic rings. The investigation results given in the paper show that in the way described the structures of the radicals in compounds of the type Ar-R (Ar = phenyl, diphenyl, naphthyl, and R = alkyl groups from C_3 to C_5) may be determined. Papers by A. V. Topchiyev, Ya. M. Paushkin, and M. V. Kurashev are mentioned in the paper. There are 2 figures, 1 table, and 22 references, 13 of which are Soviet.

SUBMITTED: September 17, 1958

Card 2/2

37772
S/661/61/000/006/063/081
D243/DJ02

15.8170
5.5310

AUTHOR: Yegorov, Yu. P.

TITLE: Some details of the oscillatory spectra of alkenyl silanes and the electron structure of the Si-C bond

SOURCE: Khimiya i prakticheskoye primeneniye kremneorganicheskikh soyedineniy; trudy konferentsii, no. 6: Doklady, diskussii, resheniye. II Vses. konfer. po khimii i prakt. prim. kremneorg. soyed., Len. 1958. Leningrad, Izd-vo AN SSSR, 1961, 282-283

TEXT: A discussion of the author's paper (this publication, no. 3, p. 37). A. N. Lazarev (IKhS AN SSSR, Leningrad), K. K. Popkov (Moscow), B. M. Mikhaylov (IOKh AN SSSR, Moscow) and A. I. Ryskiy (IKhS AN SSSR, Leningrad) took part. The author explained that the formula suggested by him for carbon-silicon compounds can be adapted for application to oxygen-silicon compounds. The Si-C bond is thought to be partly ionic and the electron shells of Si and C to be partly autonomous. B. M. Mikhaylov suggested that the analogy

Some details of ...

S/661/61/000/006/063/031
D243/D302

between butadiene and the molecules being investigated was invalid and, therefore, the author's reported phenomena would be more simply explained by an induction effect of the silicon atom. As control, the various optical properties should be studied of molecules containing an alkyl group bonded to an electro-positive atom, such as B, which unlike silicon, had no unexcited d-orbits. Ya. I. Ryskin stated that if identical atoms were joined to the Si-atom the resonance interaction of the corresponding bonds should lead to substantial spectral effects, quoting the two component (ν_s and ν_{as}) spectrum band of $(C_2H_5)_2SiF_2$ and the plain corresponding band of $(C_2H_5)_3SiF$. A change in the number of ethyl radicals does not bring changes in the system of bands, connected with oscillation of C-C bonds in these radicals.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk SSSR,
Moskva (Institute of organic Chemistry, Academy of
Sciences, USSR, Moscow) ✓

Card 2/2

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2900.1164.1273

20940

S/062/61/000/003/006/013
B117/B208

AUTHORS: Yegorov, Yu. P., Leytes, L. A., Tolstikova, N. G.,
Chernyshev, Ye. A.

TITLE: Spectroscopic investigation of the effect of the silicon atom
on multiple bonds in molecules of organosilicon compounds

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh
nauk, no. 3, 1961, 445-454

TEXT: The present paper continues a previous study (Ref. 1: A. D. Petrov,
Yu. P. Yegorov, V. F. Mironov, G. I. Nikishin, A. A. Bugorkova, Izv.
AN SSSR. Otd. khim. n. 1956, 50; Ref. 2: Yu. P. Yegorov, Ye. A. Chernyshev,
Materialy X Vsesoyuznogo soveshchaniya po spektroskopii, Izv. L'vovskogo
gos. un-ta t. 1, 1957, str. 390) on physical and chemical properties of
organosilicon compounds with multiple bonds in different positions to the
silicon atom. In particular, some para-substituted benzene derivatives
with β and γ positions of the silicon atom to the aromatic ring were
studied. The Raman spectra of the following compounds were taken:

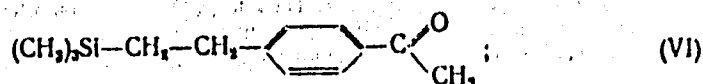
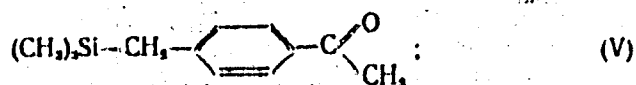
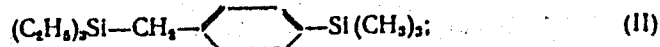
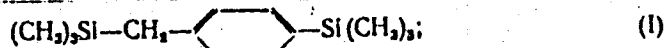
Card 1/6

20940

IX

Spectroscopic investigation of the...

S/062/61/000/003/006/013
B117/B208



Card 2/6

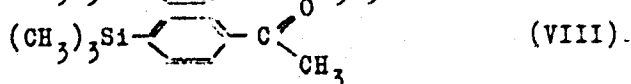
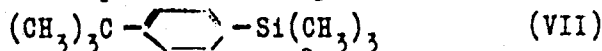
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B117/B208

Spectroscopic investigation of the...

Furthermore, the ultrared spectra were taken of compounds (I), (III), (V), (VI), as well as of compounds with α -position of silicon to the ring



p-trimethyl-silyl-tert-butyl benzene was obtained from p-chloro-tert-butyl benzene and trimethyl chloro silane by the reaction of Würtz-Fittig, and p-tri-methyl-silyl-triethyl- β -phenyl-ethyl silane by the Grignard reaction. All other silicon hydrocarbons were also prepared in tetrahydrofuran under the same conditions. Properties and yields of the resultant compounds are given in Table 5. Silicon-containing aromatic ketones were obtained by a method described in Ref. 19 (Ye. A. Chernyshev, E. N. Klyukina, A. D. Petrov, Izv. AN SSSR. Otd. khim. n. 1960, 1601). The Raman spectra were taken with an «CN-51 (ISP-51) device. The line intensity in the maximum was measured photometrically with a cyclohexane scale and by the method of the internal standard (CCl_4 was used as internal standard). An anomalous reactivity, as compared to compounds with α and

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S/062/61/000/003/006/013
B117/B208

Spectroscopic investigation of the...

positions of the silicon atom, was observed in compounds with β -position of the silicon atom to the ring. The intensity of the lines assigned to symmetric vibrations of the system $\rightarrow \text{Si} - \text{C} - \text{C} - \text{X}$ in the Raman spectrum increases. In ultraviolet spectra recorded with an CF_4 (SF-4) spectrophotometer, an increase in intensity and a bathochromic band shift is observable. The exaltation of MR_D (molecular refraction) increases. In systems $\rightarrow \text{Si} - \text{C} - \text{C} = \text{C}$ and $\rightarrow \text{Si} - \text{C} - \text{C} - \text{X}$, a specific mutual influence between the multiple bonds or the aromatic ring and the complicated electron shell of the silicon atom in the valence state occurs. This effect is possibly enhanced by the steric configuration of the system $\text{Si} - \text{C} - \text{C} - \text{X}$. As may be seen from the models by Stuart and Brigleb,

1 2 3 4
a structure is possible in these systems with the atoms 1 and 4 located so closely that van der Waal's radii overlap each other. Conclusions on this effect in compounds of different series may be drawn only after further studies of the line intensities and chemical properties. Mention is made of Ye. A. Chernyshev, M. Ye. Dolgaya, A. D. Petrov, V. M. Tatevskiy, P. P. Shorygin, B. A. Kazanskiy, V. T. Aleksanyan. There are 2 figures, 5 tables, and 19 references: 14 Soviet-bloc and 5 non-Soviet-bloc.

Card 4/6

Spectroscopic investigation of the...

S/C62/61/000/003/006/013
B117/B208

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo
Akademii nauk SSSR (Institute of Organic Chemistry imeni
N. D. Zelinskiy, Academy of Sciences USSR)

SUBMITTED: December 1, 1959

a. (a) Соединение	b. Выход, %	c. Т. кип., °C (мм рт. ст.)	d. n_D^{20}	e. d_4^{20}
$(CH_3)_3Si-CH_2-\text{C}_6H_4-Si(CH_3)_3$	84	85-80 (4)	1,4911	0,8681
$(CH_3)_3Si-CH_2-CH_2-\text{C}_6H_4-Si(CH_3)_3$	80	110-112 (5)	1,4788	0,8668
$(C_2H_5)_3Si-CH_2-\text{C}_6H_4-Si(CH_3)_3$	71	130-132 (6)	1,4990	0,8842
$(C_4H_9)_3Si-CH_2-CH_2-\text{C}_6H_4-Si(CH_3)_3$	78	139 (3)	1,4939	0,8877

Card 5/6

Table 5

FREYDLINA, R.Kh.; YEGOROV, Yu.P.; CHUKOVSKAYA, Ye.TS.; TSAO I [TS'ao I];
LUBUZH, Ye.D.

Rearrangement occurring in the process of the thermal telomeri-
zation of ethylene with silicon hydrides. Izv. AN SSSR. Otd.
khim.nauk no.7:1256-1261 J1 '61. (MIRA 14:7)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Ethylene) (Silicon hydrides) (Polymerization)

LEYTES, I.A.; YEGOROV, Yu.P.; KOLESNIKOV, G.S.; DAVYDOVA, S.L.

Study of vibrational spectra of methacrylic acid derivatives containing the elements of the IVth group. Izv.AN SSSR.Otd.khim.nauk no.11:1976-1981 N '61. (MIRA 14:11)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR i
Institut elementoorganicheskikh soyedineniy AN SSSR.
(Methacrylic acid--Spectra)

LEYTES, L.A.; YEGOROV, Yu.P.; ZUYEVA, G.Ya.; PONOMARENKO, V.A.

Dependence of the oscillation frequency of the Ge - C bond in
spectra of alkylgermanes on the nature of substituents. Izv. AN
SSSR Otd.khim.nauk no.12:2132-2140 D '61. (MIRA 14:11)

1. Institut organicheskoy khimii im. N.D.Zelinskogo Akademii nauk
SSSR i Fizicheskii institut im. P.N.Lebedeva Akademii nauk SSSR.
(Germanium organic compounds--Spectra)

53700

1273 2209 2915

28975

S/192/61/002/005/002/005
D202/D304

AUTHORS:

Yegorov, Yu.P., Leytes, L.A. and Mircnov, V.F.

TITLE:

A comparative study of combined dispersion spectra of alkyl silanes, germanates and stannates

PERIODICAL:

Zhurnal struktornoj khimii, v.2, no.5, 1961, 562-568

TEXT: This is a continuation of previous studies, in which the authors investigated the spectra of similar carbon and silicon compounds and showed that the Si atom is affected by double bonds which are in the β -position, and that in tetra-substituted silanes the substituting groups do not interact with each other. This leads to the presence in the vibrational spectra of these compounds of such frequencies which are pertinent to each substituting group (alkyl, alkenyl or aryl).

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S/192/61/002/005/002/005
D202/D304

A comparative study ...

In the present study, the authors investigated the combined dispersion spectra of 3 allyl germanates and of one allyl stannate. It was found that an allyl group joined to a Ge or Sn atom possesses a summary of characteristic frequencies as in the case of a Si atom, the intensity of corresponding lines rising additionally with the number of allyl groups; by substituting the O atom with that of Si, Ge or Sn a general spectrum change consists of a marked rise in those line intensities which depends on the vibrations of the central M atom, while their frequencies are lowered; this indicates that the interaction of the atom M with an allyl-double bond in the β -position increases in the series Si, Ge, Sn, the line-intensity corresponding to the C = C bond increasing in approximately geometrical progression. In the present work, the authors studied the combined dispersion spectra (OD) of $(CH_3)_3 - Ge - CH_2 - OH = CH_2$, $(CH_3)_2 - Ge - (CH_2 - CH = CH_2)_2$, $CH_3 - Ge - (CH_2 - CH = CH_2)_3$.

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D202/D304

A comparative study ...

$(\text{CH}_3)_3\text{Sn} - \text{CH}_2 - \text{OH} - \text{CH}_2$. They also repeated the spectrum investigation of $(\text{CH}_3)_3\text{C} - \text{CH}_2 - \text{OH} - \text{CH}_2$ which was published previously. The OD spectra were obtained on the apparatus ИСП (ISP)-51 with a medium camera; frequencies were checked with an Fe arc spectrum on the ИЗА (IZA)-2 comparator; the maximum line intensities were determined with МФ (MF)-2 and МФ-4 micro-photometers, by a method given previously; the intensities being expressed on the cyclohexane scale, that of cyclohexane lines maximum 802 cm^{-1} was taken as 250 units. As a control standard the authors used the $(\text{CH}_3)_3\text{Si} - \text{CH}_2 - \text{OH} - \text{CH}_2$ spectrum which they determined precisely previously. For calculating the intensities in respect of an equal number of molecules in the dispersing volume they used the following equation:
$$I_M = I_0 d_0 M_0 / d_c M_c$$
 where I_M is the intensity for an equal molecular number in the dispersing volume, I_0 the intensity for a

Card 3/6

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S/192/61/002/005/002/005
D202/D304

A comparative study ...

unit volume and d_o and d_c the densities of cyclohexane and of the investigated compound respectively, and M_o and M_c the molecular weights of cyclo-hexane and of the compound. The authors also determined the degree of depolarization of the most intensive CD lines by covering the vessel with the dispersing compound with a cylinder of polaroid film. These determinations were only semiquantitative. The spectra of the investigated compounds are given, together with the coefficient $K = \frac{d_{\text{CD}}}{M_o d_o}$ for intensity calculations for an equal number of molecules in the dispersing volume. Assuming that compounds of the $(\text{CH}_3)_3\text{M} - \text{CH}_2 - \text{CH} = \text{CH}_2$ type belong to the space group C_{3v} and exhibit two symmetric frame rotations of the A_1 type and one of the E type, the authors determined the frequencies of these frame vibrations, the intensities in their line

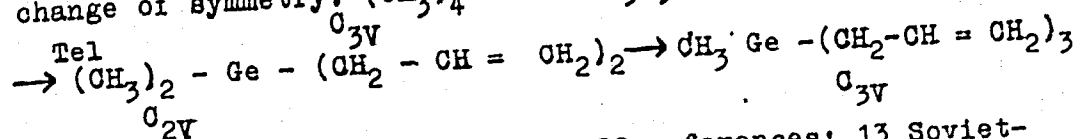
Card 4/6

28975

S/192/61/002/005/002/005
D202/D304

A comparative study ...

maxima, the integral intensities and the degree of depolarization; the integral intensities are determined on the ISP-51 apparatus with an additional FEP attachment and expressed in the cyclohexane scale, the integral cyclohexane line 802 cm being taken as 500 units. The results are given in a table. The following scheme is proposed for the changes in allyl germanates frame vibration frequencies, taking place during the change of symmetry: $(\text{CH}_3)_4\text{Ge} \rightarrow (\text{CH}_3)_3\text{Ge} - \text{CH}_2 - \text{CH} = \text{CH}_2$



There are 4 tables, 1 figure and 22 references: 13 Soviet-bloc and 9 non-Soviet-bloc. The references to the 4 most recent English-language publications read as follows: W.F. Edgell,

Card 5/6

28975

A comparative study...

S/192/61/002/005/002/005
D202/D304

C.H. Ward, J. Amer. Chem. Soc. 77, 6486, (1955); D.N. Waters,
L.A. Woodward, Proc. Roy. Soc., A246, 119, (1958); D.P. Craig,
J. Chem. Soc. 332 (1954); J. Chatt, A.A. Williams, J. Chem. Soc.
4403 (1954)

ASSOCIATION: Institut organicheskoy khimii im N.D. Zelinskogo
AN SSSR (Institute of Organic Chemistry, im N.D. Zelinskiy
AS USSR)

SUBMITTED: November 18, 1960

Card 6/6

S/020/61/136/002/018/034
B016/B060

AUTHORS: Yegorov, Yu. P. and Lubuzh, Ye. D.

TITLE: Application of Infrared Spectra in the Region of CH Stretching Vibrations to the Determination of the Structure of Alkanes, Aromatic Hydrocarbons, and Compounds Containing Heteroatoms

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 342-345

TEXT: The authors wanted to determine the range of application of infrared spectra in the region of CH stretching vibrations. They examined various considerably ramified alkanes, mono- and diphenyl alkanes, some alkyl tetralins, alkyl naphthalenes, alcohols of a normal structure, n-alkyl bromides, ketones, and silicon hydrocarbons synthesized at their Institute (Refs. 12-17). From all these substances they prepared solutions in CCl_4 (1 - 3 g/l), and the respective spectra were taken in the

2800-3060 cm^{-1} region by an MKC-12 (IKS-12) spectrometer with a LiF Card 1/4

Application of Infrared Spectra in the Region S/020/61/136/002/018/034
 of CH Stretching Vibrations to the Determination B016/B060
 of the Structure of Alkanes, Aromatic Hydrocarbons, and Compounds Con-
 taining Heteroatoms

prism. Table 1 gives the characteristics relative to the bands of the
 antisymmetric CH vibrations in the CH_2 and CH_3 groups. It was noted from
 Table 1 that the half-widths ($\Delta\nu_{1/2}$) of 2930 and 2960 cm^{-1} bands are
 only little changed in the types of compounds investigated. As there is
 a linear relationship between the intensity at the band maximum and the
 number of CH_2 and CH_3 groups, the integral intensity of the band was
 thought to represent a linear function of the number of groups. It was
 established furthermore that methyl-substituted alkanes (2-methyl-,
 3,5-dimethyl, 2,4,6-trimethyl alkanes, and others) differ only little
 from n-alkanes as to the intensity of infrared bands. "T-shaped" alkanes
 (e.g., 4-propyl heptane and 5-butyl nonane) on the other hand, have a
 coefficient $A = 100$ (A denoting the effect of groups X ($X = \text{C}_6\text{H}_5$, OH, R_3Si ,
 Hal and others) upon the adjoining methylene groups of the aliphatic R
 chain). In this manner, 1.33 of the CH_2 group per ramification are "lost"
 for the intensity of the spectrum. When determining the structure of

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Application of Infrared Spectra in the Region of S/020/61/136/002/018/034
CH Stretching Vibrations to the Determination B016/B060
of the Structure of Alkanes, Aromatic Hydrocarbons, and Compounds Con-
taining Heteroatoms

compounds containing several radicals on the aromatic ring, but only in para and meta position, one must take account of the effect of the ring upon each of these radicals. Results indicated the suitability of infrared spectroscopy for the determination of structure of hydrocarbons with a long aliphatic chain. The value of A is qualitatively connected with the electronegativity of the X groups. Thus, the series $Cl > Br > H_3C-C(=O)-OH > \alpha - C_{10}H_7 > R_3Si > C_6H_5 > CH_3 > C_6H_{11}$ shows how

the coefficient decreases. R_3Si is, however, more strongly electro-negative than phenyl. There are 1 figure, 1 table, and 24 references; 10 Soviet, 9 US, 1 Canadian, and 4 British.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy, Academy of Sciences USSR)

PRESENTED: July 20, 1960, by A. N. Nesmeyanov, Academician



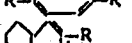

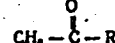
SUBMITTED: July 12, 1960

Card 3/4

Application of Infrared Spectra in the Region...

S/020/61/136/002/018/034
B016/B060

Table 1, Legend: I - types of compounds, II - n-alkanes, III - methyl-substituted alkanes, III - "T-shaped alkanes". Index ϵ_{cp} denotes mean values.

Типы соединений	n°	CH ₃				CH ₂	
		ϵ_{cp}	$\Delta\nu/\%$	A	Δn	$\epsilon_{cp}^{(2)}$	$\Delta\nu/\%$
I	7	75	28	0	0	113	20
II	13	75	28	0	0	97	21
III	10	55	28	100	1,33	132	20
	10	83	28	-40	-0,53	97	21
	17	63	28	60	0,8	100	20
	7	51	28	120	1,8	100	20
	5	51	32	120	1,8	98	20
R ₃ Si - R	10	53	28	110	1,48	120	19
α -C ₆ H ₅ - R	6	43	28	160	2,13	100	20
HO - R	13	43	30	160	2,13	110	20
	9	35	32	200	2,67	120	20
Br - R	11	31	32	220	2,94	110	20
Cl - R	3	21	30	270	3,8	110	20

Card 4/4

YEGOROV, Yu.P.; KIREY, G.G.; LEYTES, L.A.; MIRONOV, V.F.; PETROV, A.D.

Polar effects in infrared spectra of the organic compounds of some elements of the group IV. Izv. AN SSSR. Otd. khim. nauk no. 10:1880-1882 (MIRA 15:10) 0 '62.

1. Institut khimii polimerov i monomerov AN UkrSSR i Institut organicheskoy khimii im. D.N. Zolotarevskogo AN SSSR.
(Organometallic compounds—Spectra)

YEGOROV, Yu.P.; LCKHMACHEV, V.F.; YAGUPOL'SKIY, L.M.

Infrared spectra of 1-phenyl-2-trifluoromethylethylene and its derivatives. Izv. AN SSSR.Ser.fiz. 26 no.10:1276-1277 0 '62. (MIRA 15:10)

1. Institut khimii polimerov i monomerov AN UkrSSR.
(Ethylene—Spectra)

S/062/63/000/003/016/018
B101/B186

AUTHORS: Yegorov, Yu. P., Kirey, G. G., Samoylenko, S. A.,
Chernyshev, Ye. A., and Tolstikova, N. G.

TITLE: Infrared spectra of unsaturated organosilicon compounds containing a pentamethyl disilyl group

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 3, 1963, 569 - 571

TEXT: The infrared spectra of the compounds $(CH_3)_3SiSi(CH_3)_2(CH_2)_nCH=CH_2$, $n=0, 1, 2$, were investigated and the intensity and position of the $\nu(C=C)$ bands were compared with one another. It was found that $\nu(C=C)$ is 1596 cm^{-1} with the vinyl derivative ($n = 0$) and that it is shifted to 1635 cm^{-1} with the allyl derivative ($n = 1$); further, that it has maximal intensity with this compound and that it is 1638 cm^{-1} with the γ -butyl derivative ($n = 2$). The position of the other bands, as $\nu(O-H)$, $\rho(CH_2)$, $\rho(CH)$ differs little from what is usual with alkenyl silanes. According-

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Infrared spectra of ...

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B101/B186

ly substitution of the CH_3 group in the trisilyl group of an alkenyl silane by a $(\text{CH}_3)_3\text{Si}$ group does not entail any qualitative change of the spectrum. There are 1 figure and 1 table.

ASSOCIATION: Institut organicheskoy khimii im. N. D. Zelinskogo Akademii nauk SSSR (Institute of Organic Chemistry imeni N. D. Zelinskiy of the Academy of Sciences USSR)

SUBMITTED: October 29, 1962

Card 2/2

KUPRIYEVICH, V.A. [Kuprievych, V.A.]; YEGOROV, Yu.P. [Ehorov, IU.P.];
DYADYUSHA, G.G. [Diadiusha, H.H.]

Electron interaction of allyl derivatives of elements of the IV
group. Dop. AN URSR no.4:508-510 '64. (MIRA 17:5)

1. Institut khimii polimerov i monomerov AN UkrSSR. Predstavleno
akademikom AN UkrSSR A.I.Brodskim [Brods'kyi, O.I.].

KULIK, V.F.; YEGOROV, Yu.P.; MARENETS, M.S.; YAGUPOL'SKIY, L.M.

Infrared spectra and polar effects in para-substituted benzene containing the groups SCF_3 , SOCF_3 , SO_2CF_3 , and OCF_3 . Zhur.strukt. khim. 4 no.4:541-547 J1-Ag '63. (MIRA 16:9)

1. Institut khimii polimerov i monomerov AN UkrSSR, Kiyev.
(Benzene derivatives—Absorption spectra)

ACCESSION NR: A23000123

S/0062/63/000/005/0822/0831

AUTHOR: Yegorov, Yu. P.; Pushchevaya, K. S.; Lubuzh, Ye. D.; Vdovin, V. M.;
Petrov, A. D.

TITLE: Organosilicon compounds with hydrocarbon bridges between the silicon atoms

SOURCE: AN SSSR. Izvestiya otdeleniye khimicheskikh nauk, no. 6, 1963, 822-831

TOPIC TAGS: organosilicon compounds, polycondensation, polymerization, polymer, structure, IR spectroscopy, aluminum chloride, aluminum bromide

ABSTRACT: The feasibility of synthesizing polymers having alternating p-xylylene or p-phenylene radicals and silicon atoms in the backbone by the polycondensation of 1,4-bis(trimethylsilyl)xylylene or 1,4-bis(trimethylsilyl)phenylene in the presence of an Al_2Cl_6 or Al_2Br_6 catalyst has been established. The structure of previously prepared products of the catalytic polycondensation of various α,ω -bis(trimethylsilyl)alkanes as well as of the thermal polymerization of 1,1-dimethylsilacyclopropane and 1,1-dimethylsilacyclobutane have been studied by IR spectroscopy. The structure of the polymer of 1,1-dimethylsilacyclopentane,

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L 12721-63 EPR/EPF(c)/EWP(j)/EWT(m)/BDS ASD Pr-4/Pe-4/Pc-4 RM/wd
 ACCESSION NR: AP3002295 S/0062/63/000/006/1114/1117

AUTHOR: Yegorov, Yu. P.; Leytes, L. A.; Kravtsova, I. D.; Meronov, V. F. 72

TITLE: Effect of the nature of silyl and germly groups on the Raman spectra of
allyl silanes and allyl germanes

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1114-1117

TOPIC TAGS: Raman spectra, allyl silanes, allyl germanes, F, Cl, Br

ABSTRACT: The effect of the nature of the halogen in compounds of the formula $X \text{ sub } 3 \text{ M} - \text{CH} \text{ sub } 2 - \text{CH} = \text{CH} \text{ sub } 2$ where M is Si or Ge and X is F, Cl or Br, on the frequency and intensity of the Raman lines was investigated. Frequency increased with the series CH sub 3 is less than Br is less than Cl is less than F, and intensity increased in the series F is less than Cl is less than CH sub 3 is less than Br. The "barrier effect" concept of Si and Ge atoms in the investigated compounds is discussed. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: Institut organicheskoy khimii im N. D. Zelinskogo Akademii nauk SSSR
 (Institute of Organic Chemistry, Academy of Sciences, SSSR)

Card 1/2,

YEGOROV, Yu.P.; KIREY, G.G.

Spectroscopic study of the effect of atoms of the IV^a group of elements on the multiple bonds of vinyl and allyl derivatives. Zhur. ob. khim. 34 no.11:3615-3621 N '64 (MIRA 18:1)

1. Institut khimii polimerov i monomerov AN UkrSSR.

L 21824-66 EWP(j)/EWT(m) RM/GS

ACC NR: AT6006250

SOURCE CODE: UR/0000/65/000/000/0096/0099

AUTHOR: Yegorov, Yu. P.; Bezruk, L. I.; Panchenko, L. I.

ORG: Institute of the Chemistry of High Molecular Compounds AN UkrSSR (Institut khimi vysokomolekulyarnykh soyedinyey AN UkrSSR)

TITLE: Effect of mineral additives^b on polycaprolactam¹ crystallinity

SOURCE: AN UkrSSR. Modifikatsiya svoystv polimerov i polimernykh materialov (Modification of the properties of polymers and polymeric materials). Kiev, Naukova dumka, 1965, 96-99

TOPIC TAGS: polymer, crystalline polymer, polymer structure, solid mechanical property, synthetic material

ABSTRACT: The effect of SiO₂-marshallite, Al₂O₃-corundum, TiO₂-rutile, and Fe₂O₃ on the physico-mechanical and structural properties of polycaprolactam was investigated. Crystallinity was examined using 3 mm² samples and a UEMV-10 electron microscope with 8,000-10,000 magnification. Tensile strength was measured on standard samples of 2 x 4 x 55 mm and the transverse strength was measured on 4 x 6 x 55 mm.

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L 21824-66

ACC NR: AT6006250

0

bars using the FM-500-machine (manufactured by the Rauenstein Company). Mineral additives with an average particle diameter of 1-50 microns were added either during the polymerization process or into the finished polycaprolactam. It was found that all these mineral additives promote crystallinity in polycaprolactam, and improve the mechanical properties of the products. The effect of mineral additives on physico-mechanical properties of polycaprolactam is shown in table 1. Orig. art. has: 18 figures, 2 tables.

TABLE 1

Mechanical Property	Pure poly-caprolactam	Powdered silica gel		Fe ₂ O ₃		TiO ₂	Al ₂ O ₃
		5%	10%	10%	20%	50%	50%
Hardness HB	9.3	11.0	12.4	10.8	11.2	12.8	14.0
Transverse strength, kg/cm ²	875	1210	840	1402	1380	1260	1420
Relative elongation during stretching, %	220	48	24	110	100	59	40

SUB CODE: 11/

SUBM DATE: 06Oct65/

ORIG REF: 008/

OTH REF: 007

Card 2/2 nst

YEGOROV, Yu.P.

Effect of the mutual influence of atoms in hydrides and alkyl derivatives of the IV th group of elements (C, Si, Ge, Sn).
Teoret. i eksper. khim. 1 no.1;30-40 Ja-F '65. (MIRA 18:7)

1. Institut khimii vysokomolekulyarnykh soyedineniy AN UkrSSR, Kiyev.

KULIK, V.F.; YEGOROV, Yu.P.; PANTELEYMONOV, A.G.; FIALKOV, Yu.A.; YAGUPOL'SKIY, L.K.

Electronic interaction and infrared spectra of para-derivatives of benzene $X - C_6H_4 - Y - CF_3$. Teoret. i eksper. khim. 1 no.2:171-178 (MIRA 18:7)
Mr-Apr '65.

1. Institut khimii vysokomolekulyarnykh soyedineniy AN UkrSSR, Kiyev i Institut organicheskoy khimii AN UkrSSR, Kiyev.

LEYTES, L.A.; PAVLOVA, I.D.; YESOROV, Yu.V.

Theoretical analysis of vibration spectra of vinyl derivatives
of the 4b group of elements and $p\pi$ and π -conjugation. Teoret.
i eksper. khim. 1 no.3:311-323 Myaia '65. (MIRA 18.9)

1. Institut organicheskoy khimii imeni N.M. Zelinskogo AN SSSR,
Moskva, i Institut khimii vysokomolekulyarnykh soedineniy AN
UkrSSR, Kiyev.

thetic process

"APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001962510012-4

APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001962510012-4"

YEGOROV, Yu.P.; LOKTIONOVA, R.A.

Spectroscopic study of the mutual influence of atoms in aromatic derivatives of elements of group IV. Teoret. i eksper. khim. 1 no.2:160-170 Mr-Ap '65. (MIRA 18:7)

1. Institut khimii vysokomolekulyarnykh soyedineniy AN UkrSSR, Kiyev.

YEGOROV, Yu.P.; MOROZOV, V.P.; KOVALENKO, N.F.

Spectroscopic properties and reactivity of hydrides of group IV.
Ukr.khim.zhur. 31 no.2:123-132 '65.

(MIRA 18:4)

1. Institut khimii vysokomolekulyarnykh soyedineniy AN UkrSSR
i Dnepropetrovskiy khimiko-tehnologicheskii institut.

*The amplitude of the characteristic vibrations is approximate.

"APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001962510012-4

SUBMITTED: 25 JUL 194

OTHER: 005

APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001962510012-4"

KORNEV, K.A., glav. red.; SHEVLYAKOV, A.S., red.; CHERVYATSOVA,
L.L., red.; SMETANKINA, N.P., red.; YEGOROV, Yu.P.,
red.; ROMANKEVICH, M.Ya., red.; KUZNETSOVA, V.P., red.;
PAZENKO, Z.N., red.; KACHAN, A.A., red.; VOYTSEKHOVSKIY,
R.V., red.; GREKOV, A.P., red.; DUMANSKIY, I.A., red.;
AVDAKOVA, I.L., red.; VYSOTSKIY, Z.Z., red.; GUMENYUK,
V.S., red.; MEL'NIK, A.F., red.

[Synthesis and physical chemistry of polymers; articles
on the results of scientific research] Sintez i fiziko-
khimiia polimerov; sbornik statei po rezul'tatam
nauchno-issledovatel'skikh rabot. Kiev, Naukova dumka,
1964. 171 p. (MIRA 17:11)

1. Akademiya nauk URSR, Kiev. Institut khimii vysokomoleku-
lyarnykh soyedineniy. 2. Institut fizicheskoy khimii im. L.V.
Pisarzhevskogo AN USSR (for Iotskiy). 3. Institut khimii
vysokomolekulyarnykh soyedineniy AN USSR (for Romankevich,
Chervyatsova, Voytsekhovskiy).

YEGOROV, Yu.S.; LATYSHEV, G.D.

Stabilization of magnetic fields based on nuclear resonance. Prib.
1 tekhn.eksp.no.2:80-85 S-0 '56. (MLRA 10:2)

1. Leningradskiy Institut inzhenerov zheleznodorozhnogo transporta.
(Nuclear magnetic resonance) (Magnetic fields--Measurement)

LATYSHEV, G.D.; SERGEYEV, A.G.; KRISYUK, E.M.; OSTRETSOV, L.A.;
YEGOROV, Yu.S.; SHIRSHOV, N.M.

Natural breadth of the internal conversion lines of the active
precipitate of radiothorium. Izv.AN SSSR, Ser.fiz. 20 no.3:
354-362 Mr '56. (MLRA 9:8)

1. Kafedra fiziki Lenigradskogo instituta inzhenerov zheleznodorozhnogo transporta imeni V.N. Obratsova.
(Radiothorium--Spectra)

YEGOROV, Yu.S.

120-5-9/35

AUTHORS: Yegorov, Yu.S., Latyshev, G.D., and Trulev, Yu.I.

TITLE: Stabilization of the Magnetic Field in Magnetic Spectrometers (Stabilizatsiya magnitnogo polya v magnitnykh spektrometrakh)

PERIODICAL: Priroda i Tekhnika Eksperimenta, 1957, No.5,
pp. 41 - 46 (USSR).

ABSTRACT: An instrument is described which uses the phenomenon of nuclear proton resonance to stabilize the magnetic field in a beta spectrometer. The stable point of operation may be chosen anywhere in the range 140 to 1 400 Oe. The degree of stabilization is approx. $2 \cdot 10^{-5}$ for fields greater than 300 Oe and $4 \cdot 10^{-5}$ for fields greater than 140 Oe. Table 1 gives details of the pick-up coil. For fields up to 940 Oe, the coil is a toroid of volume 13 cm³ and Q-value about 70. Fig. 1 is the circuit of the amplitude bridge and l.f. amplifier. Fig. 2 shows the phase-detector and d.c. amplifier. Fig. 4 is the F-line resonance ($H_0 = 1\,389$). This curve was repeated 5 times and the position of the maximum could be located to an accuracy of $4 \cdot 10^{-5}$. The equipment has been used over a period of four months for investigating the electron spectrum of RaTh in the range 140 to 2 600 keV. The stabilization coefficient of the circuit against changes in the current in the main field coil

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120-5-9/35

Stabilization of the Magnetic Field in Magnetic Spectrometers.

is 100. The main field was supplied from accumulators and had a drift rate of 0.01%/sec. in current. The dominant time constant in the feedback circuit was 5 sec. A note added in proof reports that the lower limit to the field which can be stabilized has recently been reduced to 12 Oe, while measurements may extend down to 5 Oe.

There are 6 figures, 1 table and 12 references, 7 of which are Slavic.

ASSOCIATION: Leningrad Institute of Railway Transport Engineers
(Leningradskiy institut inzhenerov zheleznodorozhnogo transporta)

SUBMITTED: December 29, 1956.

AVAILABLE: Library of Congress
Card 2/2

SOV/120-58-2-36/37

AUTHORS: Zhernovoy, A. I., Yegorov, Yu. S. and Latyshev, G. D.

TITLE: Measurement and Stabilisation of Weak Magnetic Fields
Using Proton Magnetic Resonance (Izmereniye i stabilizatsiya
slabykh magnitnykh poley na osnove magnitnogo rezonansa
protonov)

PERIODICAL: Priory i Tekhnika Eksperimenta, 1958, Nr 2, p 115
(upper half) (USSR)

ABSTRACT: Up to the present time the method of nuclear resonance has only been used in the measurement and stabilisation of strong and intermediate magnetic fields. In the case of weak fields the application of the method was difficult because of a small signal to noise ratio. The authors have considerably reduced the dependence of the amplitude of the signal on the magnitude of the measured field by the use of a preliminary magnetisation of the current of water in a subsidiary magnet giving rise to a strong field. In this way it was found to be possible to measure and stabilise magnetic fields of a few oersted with small volume specimens. The accuracy of measurement is limited only by the accuracy with which the frequency can be measured. The

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SOV/120-58-2-36/37

Measurement and Stabilisation of Weak Magnetic Fields Using Proton Magnetic Resonance.

coefficient of stabilisation for the scheme described in Ref.1 is 300. A full description of the work will be published in the future issue of this journal. There is 1 Soviet reference.

ASSOCIATION: Leningradskiy institut inzhenerov zheleznodorozhnogo transporta (Leningrad RR Transport Engineering Institute)

SUBMITTED: October 31, 1957.

1. Magnetic fields--Stabilization
2. Magnetic fields--Measurement
3. Nuclear magnetic resonance--Applications
4. Frequency--Measurement

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SOV/120-58-2-37/37

AUTHORS: Zhernovoy, A. I., ~~Yegorov, Yu. S.~~ and Latyshev, G. D.

TITLE: A New Method of Measuring Uniform and Non-Uniform Magnetic Fields Using Proton Magnetic Resonance (Novyy metod izmereniya odnorodnykh i neodnorodnykh magnitnykh poley na osnove magnitnogo rezonansa protonov)

PERIODICAL: Priory i Tekhnika Eksperimenta, 1958, Nr 2, p 115 (lower half) (USSR)

ABSTRACT: A method has been developed for the measurement of magnetic fields using the phenomenon of nutation of the total magnetic moment of nuclei. The measurement was carried out using a continuous current of water which in turn passes through a magnetising region in an auxiliary strong field, the region where the field is to be measured (with a superimposed high frequency transverse field which produces the nutation), and then enters the usual set up for the observation of nuclear resonance. If the frequency of the high frequency field is equal to the frequency of precession of the nuclei, the phenomenon of nutation takes place in the measured field and the nuclear resonance signal disappears or changes polarity. In practice fields between 0.17 and 500 oersted with non-uniformities of up

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SOV/120-58-2-37/37

A New Method of Measuring Uniform and Non-Uniform Magnetic Fields
Using Proton Magnetic Resonance.

to 200 oersted/cm have been measured. A full description
will be given in a paper to be published in a future issue
of this journal.

ASSOCIATION: Leningradskiy institut inzhenerov zheleznodorozhnogo
transporta (Leningrad RR Transport Engineering Institute)

SUBMITTED: October 31, 1957.

1. Magnetic fields--Measurement 2. Nuclear magnetic resonance--
Applications 3. Frequency--Measurement

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USCOMM-DC-55889

SOV/120-58-5-17/32

AUTHORS: Zhernovoy, A. I., Yegorov, Yu. S., Latyshev, G. D.

TITLE: A New Method of Measuring Uniform and Non-Uniform Magnetic Fields, Using Proton Magnetic Resonance (Novyy metod izmereniya odnorodnykh i neodnorodnykh magnitnykh poley na osnove magnitnogo rezonansa protonov)

PERIODICAL: Priory i tekhnika eksperimenta, 1958, Nr 5, pp 71-72 (USSR)

ABSTRACT: A method is suggested for measuring magnetic fields between 0.17 and 500 oersted with non-uniformities up to 200 oersted/cm. The method is based on the phenomenon of nutation, which consists in the change in the precession cone of the total magnetic moment of nuclei under the action of a transverse field oscillating with a frequency $\omega = \gamma H$, where H is the magnetic field in which the nuclei are placed, and γ is the gyromagnetic ratio. The apparatus is illustrated diagrammatically in Fig.1. The flowing water from a magnetising field enters into a nutation element which is placed in the measured field and then passes into an

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SOV/120-58-5-17/32

A New Method of Measuring Uniform and Non-Uniform Magnetic Fields, Using Proton Magnetic Resonance

absorption element placed in a uniform field and which serves as the detector of nutation. The nutation element is in the form of a coil of a few turns placed on a glass tube. If the frequency of the generator $\omega \neq \omega_0$, where $\omega_0 = \gamma_p H_0$, γ_p is the gyromagnetic ratio and H_0 is the measured field, then the absorption signal is given by:

$$A \sim M_0 \exp(-V_T / QT_1) \quad , \quad (1)$$

where V_T is the volume of the connecting tube between the absorption and nutation elements, Q is the water flow, T_1 is the longitudinal relaxation time, and M_0 is the total magnetic moment of protons per unit volume of water passing through the nutation element. If the frequency of the generator is $\omega = \omega_0$, then, due to the nutation of the vector M_0 from the direction of H_0 , transverse components M_x and M_y appear in the nutation element

Card 2/5 volume V_N . In that case the signal will be given by:

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A New Method of Measuring Uniform and Non-Uniform Magnetic Fields,
Using Proton Magnetic Resonance

$$A \sim \left[M_z^2 \exp(-2V_T/QT_1) + (M_x^2 + M_y^2) \exp(-2V_T/QT_2^*) \right]^{1/2}, \quad (2)$$

where T_2^* is the transverse relaxation time. Since $T_1 \gg T_2^*$, it follows that $A \sim M_z$. When $V_N/Q \ll T_1$,

$\Delta H_0 < H_1$, $\omega = \omega_0$ and ΔH_0 is the non-uniformity of the field in the volume of the nutation element while H_1 is equal to half the amplitude of the oscillating field, then it follows from the solution of Bloch's equation, that:

$$M_z = M_0 \left(\cos K \gamma H_1 \frac{V_H}{Q} + \frac{1}{2T_2 K \gamma H_1} \sin K \gamma H_1 \frac{V_H}{Q} \right) \exp \left(- \frac{V_H}{2T_2 Q} \right), \quad (3)$$

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A New Method of Measuring Uniform and Non-Uniform Magnetic Fields,
Using Proton Magnetic Resonance

where $K = (1 - 1/4T_2^2\gamma^2H_1^2)^{1/2}$. It follows from Eq.(3) that the nutation angle $\theta = K\gamma H_1 V_N/Q$ governs the form of the absorption signal. If $\theta = n\pi$, then for even n the signal is positive and for odd n it is negative. If $\theta = (2n - 1)\pi/2$, then the signal is equal to 0. This is in good agreement with experiment. The dependence of the amplitude of the first negative signal on Q is shown in Fig.2. It is clear from this plot that the first multiplier in Eq.(3) agrees with experiment. For

$V_N = 0.2 \text{ cm}^3$ it was found that $T_2 = 3.6 \times 10^{-3}$ sec. The legend of Fig.1 is as follows: H_0 is the measured magnetic field, 6 nutation element, 1 frequency generator, 2 frequency meter, 5 nuclear absorption element, 3 and

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A New Method of Measuring Uniform and Non-Uniform Magnetic Fields,
Using Proton Magnetic Resonance

4 detectors of nuclear absorption signal. There are 2
figures and 2 references, 1 of which is English and 1
Soviet.

ASSOCIATION: Leningradskiy institut inzhenerov Zh.-D. transporta
(Leningrad Institute for Railway Transport Engineering)

SUBMITTED: October 31, 1957.

Card 5/5

SOV/120-50-5-18/32

AUTHORS: Zhernovoy, A. I., Yegorov, Yu. S., Latyshev, G. D.

TITLE: Measurement and Stabilization of Weak Magnetic Fields Using Proton Magnetic Resonance (Izmereniye i stabilizatsiya slabykh magnitnykh poley na osnove magnitnogo rezonansa protonov)

PERIODICAL: Priory i tekhnika eksperimenta, 1958, Nr 5, pp 73-75 (USSR)

ABSTRACT: Proton magnetic resonance is used to measure and stabilize weak, uniform magnetic fields. The apparatus constructed for this purpose may be used to measure magnetic fields beginning with 5 oersted. The magnetic fields may be measured with an accuracy whose lower limit is 10^{-4} and which increases as the field increases. The stabilization of magnetic fields is obtained beginning with 12 oersted. The stabilization coefficient at its lower limit is equal to 300. The working substance is pure water (Refs.6 and 7). The element through which the water is flowing is in the form of a glass tube. The length of the high frequency coil wound directly on the tube is 5 cm. The frequency of

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SOV/120-58-5-18/32

Measurement and Stabilization of Weak Magnetic Fields Using Proton
Magnetic Resonance

the modulation of the field is 15 c/s. There are 5 figures
and 7 references, of which 1 is Swiss, 3 English and 3
Soviet.

ASSOCIATION: Leningradskiy institut inzhenerov zh.-d, transporta
(Leningrad Institute for Railway Transport Engineering)

SUBMITTED: October 31, 1957.

Card 2/2

ZHERNOVOY, A.I.; YEGOROV, Yu.S.; LATYSHEV, G.D.

Using proton resonance in measuring nonuniform magnetic fields [with summary in English]. Inzh.-fiz. zhur. no. 9:123-127 S '58.

(MIRA 11:10)

1. Institut inzhenerov zheleznodorozhnogo transporta, g. Leningrad.
(Magnetic fields--Measurement)
(Nuclear magnetic resonance)

ZHERNOVOY, A.I.; YEGOROV, Yu.S.; LATYSHEV, G.D.

Using proton resonance in measuring and stabilizing weak
uniform magnetic fields [with summary in English]. Inzh.-fiz.
zhur. 1 no.8:95-97 Ag '58. (MIRA 11:8)

1. Institut inzhenerov zheleznodorozhnogo transporta, Leningrad.
(Magnetic fields--Measurement) (Nuclear magnetic resonance)

SOV/48-22-8-14/20

AUTHORS: Zhernovoy, A. I., Yegorov, Yu. S., Latyshev, G. D.

TITLE: Estimation of Magnetic Field Strength Measurement Accuracy by Means of the Nutation Method (Otsenka tochnosti izmereniya magnitnogo polya metodom nutatsii)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1958, Vol. 22, Nr 8, pp. 988 - 992 (USSR)

ABSTRACT: This principle was already described in reference 7. The amplitude of the nuclear resonance signal is proportional to the projection of the vector of the total magnetic nuclear moment upon the direction of the external field. In a homogeneous field the first negative absorption signal occurs at an accurate resonance, if

$$\gamma H_1 \frac{v}{Q} = \pi \quad (2)$$

As can be seen from figure 2 the absorption signal can have a negative polarity only, if the field is displaced from the resonance value to $\Delta H < 0,8H_1$. Outside the $\Delta H = 3H_1$ zone the nutation effect is practically missing. In an inhomogeneous

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SOV/48-22-8-14/20

Estimation of Magnetic Field Strength Measurement Accuracy by Means of the Nutation Method

field formula (2) does not hold any longer for two reasons:

1) The occurrence of a transverse inhomogeneity of the field

ΔH reduces the relaxation period T_2^+ to $T_2^+ \sim \frac{1}{\gamma \Delta H}$.

2) The conditions of an accurate resonance cannot be satisfied in all points of the nutation pick-up (datchik). From the formula

$$M_z = M_0 \left[1 - \frac{H_1^2}{H_1^2 + \Delta H^2} \left(\cos \theta \sqrt{H_1^2 + \Delta H^2} - \frac{V_h}{Q} - 1 \right) \right] \quad (1),$$

however, it proceeds that the nutation frequency will be equal to

$$\Omega = \gamma \sqrt{H_1^2 + \Delta H^2} \quad (10),$$

if the field differs from the resonance value by ΔH . A consideration of optimum conditions and taking into account the demand (6) $dK_d \ll 1,5 H_1$ for a cylindrical pick-up furnishes

the formulae for such dimensions as ensure a minimum error:

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SOV/48-22-8-14/20

Estimation of Magnetic Field Strength Measurement Accuracy by Means of the Nutation Method

$$d_{\text{opt}} = \sqrt{\frac{6 Q}{\gamma \mu K_d}}; \quad l_{\text{opt}} = \sqrt{\frac{12 Q}{\gamma \mu K_1}}.$$

It is apparently better to direct the water flow in the direction of the gradient of the external field. If the pick-up (datchik) is shaped like a parallelepipedon with the lateral lengths a , b , l , and the gradients of the field are taken to be directed along the sides K_a , K_b , K_l and if the water flows along l , the optimum parameters can be found from the subsequent conditions:

$$Q_{\text{opt}} = \frac{1,5 H_1}{K_a}, \quad b_{\text{opt}} = \frac{1,5 H_1}{K_b}, \quad l_{\text{opt}} = \frac{3 H_1}{K_l};$$

$$H_1 = \sqrt[4]{\frac{\pi Q}{\gamma \mu K_a K_b K_l}} = 0,07 \left[\text{Oe}^{1/4} \text{ sec}^{1/4} \right] \sqrt[4]{Q K_a K_b K_l};$$

$$\sigma_{\text{min}} = 0,75 H_1$$

The results permit to draw the conclusion that this method will yield good results in measurements of absolute field strength

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SOV/48-22-8-14/20

Estimation of Magnetic Field Strength Measurement Accuracy by Means of the
Nutation Method

with pronounced gradients. As the nutation effect is independent from the field strength of the external field it may be useful in measurements of very weak fields. In practical work the accuracy can still be increased. The preliminary experimental results do not contradict the given data. There are 2 figures, 2 tables, and 2 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy institut inzhenerov zheleznodorozhnogo transporta
im. V. N. Obraztsova (Leningrad Institute of Railroad Transport
Engineers imeni V. N. Obraztsov)

Card 4/4

YEGOROV Yu. S.

24 (7)

Articles:
Bogoyev, A. G., Vorob'yev, V. D.,
Bogoyev, A. G., Sol'chinskaya, T. I.,
Letyagin, G. S., Izvestiya, No. 8.

Title:
The Influence Exerted by Finite Dimensions of
Solid Bodies on the Coefficients of Internal
Conversion in L-subshells (Vliyaniye konechnykh
razmeryov tel na vnutrennyye koefitsienty
vnutrenney konversii v L-podobolochkakh)

Periodical:
Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
Vol. 35, No. 2, pp. 348-354 (1958)

Abstract:
As the experimental and theoretical values of conversion
coefficients agree only very badly (ratio 1 - 10), the
authors undertook the task of finding out to what extent the
finite dimensions of nuclei influence these values. The
present paper contains a report on the experimental
investigations concerning this influence which is exercised
on the relative conversion coefficients in L-subshells
for pure M-transitions. The following transitions were
investigated:

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46.5 keV - decay: $\text{La}^{138} \rightarrow \text{Ba}^{138}$
115.1 keV $\text{Th}^{232} \rightarrow \text{Ac}^{232}$
234.6 keV $\text{Th}^{232} \rightarrow \text{Pa}^{232}$

The following was found for the ratio $L_I : L_{II} : L_{III}$

$100 : (10.6 \pm 0.2) : (0.93 \pm 0.05)$
 $100 : (10.4 \pm 0.2) : (0.88 \pm 0.10)$
 $100 : (10.4 \pm 0.2) : (0.74 \pm 0.05)$

For the first and for the 3. transition results obtained by
Kochlov, Dzholepov, Cherninskaya, and those of references
10, 11, 16, 17 have already been published; they are
compared in this paper with the results obtained by the
authors. Furthermore, the relative conversion coefficients
for the 277.3 keV - γ -transition (M_1) between two excited
levels in Pu^{208} was investigated, viz. for the levels
3474.8 keV (6^+) and 3197.5 keV (5^+). Here a 22-admixture

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Conversion in L-subshells

is possible. Result:

$L_I : L_{II} : L_{III} = 100 : (12.3 \pm 0.6) : (1.2 \pm 0.3)$
There are 4 figures, 3 tables, and 26 references, 17 of which
are Soviet.

Association:
Leningradskiy Institut Inzhenerov Zhелеznodorozhnogo
Transporta (Leningrad Railroad Engineers Institute)

Submitted:
March 6, 1958 (initially) and July 9, 1958 (after revision)

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21(3)

AUTHORS:

SOV/48-23-2-16/20
Yegorov, Yu. S., Seliverstov, D. M., Latyshev, G. D.,
Zhernovoy, A. I.

TITLE:

Instrument for Measurement and Stabilization of the Magnetic
Field in Spectrometers (Ustanovka dlya izmereniya i stabili-
zatsii magnitnogo polya v spektrometrakh)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,
Vol 23, Nr 2, pp 244-250 (USSR)

ABSTRACT:

In this paper a universal measuring instrument and a stabilizer
of the magnetic field for spectrometers is designed. The in-
strument is based on the principle of measurement and stabili-
zation of the magnetic field by magnetic nuclear resonance.
It permits the measurement of magnetic fields within the
range 3 - 2500 Oe and stabilization within the range 10-2500 Oe.
For good resolution of the lower limit the authors applied
the method of previous magnetization of water. (Fig 2, block
scheme of the instrument in figure 1), whereby the lower limit
of the field strength to be measured can be reduced to 3 Oe.
Due to the ratio of signal noise obtained by this method it
is possible to use the signal of nuclear resonance for stabiliz-

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SOV/48-23-2-16/20

Instrument for Measurement and Stabilization of the Magnetic Field in Spectrometers

ing the field of the spectrometer also at a field strength of 10 Oe. For the purpose of obtaining the signals of nuclear resonance the scheme of the Franklin generator was applied, as suggested by Pound (Ref 8). Reactive tubes of the type 6Zh5P were used for frequency stabilization, whereby a frequency stability of the generator of $8 \cdot 10^{-6}$ was obtained within a wide range of frequency. There are 6 figures and 10 references, 7 of which are Soviet.

ASSOCIATION: Leningradskiy institut inzhenerov zheleznodorozhnogo transporta im. V. N. Obraztsova
(Leningrad Institute for Railroad Engineers imeni V. N. Obraztsov)

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21(3)
AUTHORS:

SOV/48-23-2-17/20
Yegorov, Yu. S., Seliverstov, D. M., Latyshev, G. D.

TITLE:

Frequency Meter for Nuclear Resonance (Izmeritel' chastoty dlya yadernogo rezonansa)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 2, pp 251-254 (USSR)

ABSTRACT:

For the use of nuclear resonance for the measurement and stabilization of magnetic fields the accuracy of measurement is of special importance. On the other hand, the accuracy of the measurement of magnetic fields is determined by the accuracy of the measurement of high-voltage frequencies. The frequencies are measured by comparison with quartz frequencies. A block scheme of the frequency meter MK-3 is given in figure 1, and the accurate scheme is contained in figure 2. A precise description of the apparatus is given. With subdivision of the quartz-generator frequency into 10 kc each the difference of the frequency to be measured between two neighboring harmonics of the multivibrator is found within the limits of 0 and 5 kc. The error caused in the measurements amounts to $\pm(7-10)$ c. For the purpose of reducing the error an oscillograph is applied whereby the frequencies can be measured

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Frequency Meter for Nuclear Resonance

SOV/48-23-2-17/20

according to Lissajous figures. The error is then reduced to
+ 2 cycles. In the case of frequency measurements above
4950 cycles the multivibrator is divided into 20 kc each.
There are 4 figures and 2 Soviet references.

ASSOCIATION: Leningradskiy institut inzhenerov zheleznodorozhnogo trans-
porta im. V. N. Obratsova
(Leningrad Institute for Railroad Engineers imeni V. N. Obratsov)

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S/136/60/000/011/002/013
E021/E406

AUTHORS: Alekseyev, Yu.V. and Yegorov, Yu.S.

TITLE: Preparation of Active Nickel Powder by Reduction of Commercial Nickel Oxide with Hydrogen

PERIODICAL: Tsvetnyye metally, 1960, No.11, pp.33-36

TEXT: Experiments have been carried out in the laboratories of the Severonikel' Combine to test the effect of the method of preparation of nickel oxide on the properties of the nickel powder produced from the oxide. The method of preparation of the active nickel powder is given in Fig.2. Dried hydrogen is passed through a rotary tube furnace into which nickel oxide is fed. The material is in the hot zone for 4 to 4.5 hr. The nickel oxide used was obtained by a two-stage roasting process of a nickel concentrate in a multi-hearth furnace at 800 to 850°C and in a tube furnace at 1100 to 1250°C. Its average composition was 73% Ni, 2 to 9% Cu, 1 to 6% Co and 0.05 to 0.3% S. The activity of the nickel powder produced by hydrogen reduction was tested by its precipitation of copper from copper sulphate. Reduction of the nickel oxide at 450, 550 and 650°C was tried. The highest activity was obtained in the temperature region 560 to 650°C (Fig.4). At temperatures less

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E021/E406

Preparation of Active Nickel Powder by Reduction of Commercial nickel Oxide with Hydrogen

than 550°C the activity is determined by the degree of reduction of the nickel oxide. The nickel content was 85 to 91% at 450°C, 90 to 92% at 550°C and 92 to 94.1% at 650°C. Nickel powders were screened through 0.5, 0.25 and 0.15 mm sieves. From table 1, it can be seen that activity increases with decrease in particle size. The cement copper obtained by the precipitation tests with nickel contained 5 to 10% Ni when hydrogen-reduced nickel was used. 27 to 50% Ni was found in the cement copper after precipitation with nickel powder from the works. These results throw doubt on the conclusions of S.Ye.Lyumkis (Ref.5) who asserted that nickel oxide produced at low temperatures (800°C) should be used to prepare active nickel powder. There are 5 figures, 2 tables and 6 Soviet references.

ASSOCIATION: Kombinat Severonikel' (Severonikel' Combine)

Card 2/2

YEGOROV, Yu.S.; CHETVERTKOV, M.S.; SLOBODIN, Yu.A.

Conditions of electrode baking in a charge-resistance furnace and
the quality of the electrode mass. TSvet. met. 37 no.10:29-33 0
'64. (MIRA 18:7)

GRIGOR'YEV, Ye.P.; YEGOROV, Yu.S.; ZOLOTAVIN, A.V.; SERGEYEV, V.O.; SOVTSOV,
M.I.

On Mo⁹⁰ decay. Izv. AN SSSR.Ser. fiz. 29 no.5:721-728 My '65.
(MIRA 18:5)

27052-66

EWT(1)/EWT(M) DEFAB/2 EWT(1) 21- 30, AS, 00

ACC NR: AP6011550

SOURCE CODE: UR/0051/66/020/003/0382/0386

AUTHOR: Yegorov, V. S.; Skrebov, V. N.; Shukhtin, A. M.

ORG: none

TITLE: Concentrations of normal atoms in the case of a pulsed discharge in metal vapor

SOURCE: Optika i spektroskopiya, v. 20, no. 3, 1966, 382-386

TOPIC TAGS: metal, vapor state, dc discharge, atomic property, mercury, cesium, physical diffusion

ABSTRACT: This is a continuation of earlier work (Izv. AN SSSR ser. fiz. v. 19, 15, 1965 and earlier) on the effect of a dc discharge in metal vapor on the concentration of the normal atoms on the axis of the discharge gap. The present study, aimed at determining the rate of variation of the concentration of the normal atoms after the discharge current is turned on, is devoted to measurement of the concentration of the normal atoms of cesium and mercury vapor in different phases of a current pulse of duration 5 - 20 μ sec and at current densities 1 - 100 a/cm^2 . The Hook method was used to measure the concentrations of the normal atoms. The experimental setup was described elsewhere (Opt. i spektr. v. 4, 543, 1957). Under certain conditions, an appreciable decrease in the concentration of the normal atoms and of the density of matter in the axial part of the discharge tube were observed upon passage of the current pulse. It is assumed that the most likely cause of this decrease is ioniza-

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UDC: 537.523/.527 + 539.18

ACC NR: AF6011550

tion of the metal vapor atoms. The density of the material decreases because of the drift of the charged particles to the walls in the form of ambipolar diffusion current. This radial transport of matter causes appreciable inhomogeneities in the distribution of the metal over the cross section of the discharge tube. Orig. art. has: 2 figures, 1 formula, and 2 tables.

SUB CODE: 20/ BUEN DATE: 08Feb65/ ORIG REF: 007/ OTH REF: 001

Card 2/21

STANOV, V. M.; YEGOROV, YU. V., ENG.; TRUBAKOV, N. A., ENG.

Electric Circuits

Protection schemes for alternative operating current. Elek. sta. 23 no. 8, 1951.

Monthly List of Russian Accessions, Library of Congress, November 1952. UNCLASSIFIED.

YEGOROV, Yu.V. (Moskva)

Necessary conditions of optimum control in Banach spaces.
Mat. sbor. 64 no.1:79-101 My '64. (MIRA 17:6)

BR

ACCESSION NR: AP4037551

S/0039/64/064/001/0079/0101

AUTHOR: Yagorov, Yu. V. (Moscow)

TITLE: Necessary conditions for the optimal control in Banach spaces

SOURCE: Matematicheskii sbornik, v. 64, no. 1, 1964, 79-101

TOPIC TAGS: optimal control, necessary optimality condition, Banach space, Pontryagin maximum principle

ABSTRACT: Two Banach spaces B_1 and B_2 are assumed in which each element of the space B_1 is also an element of the space B_2 . Corresponding to each pair of elements $x \in B$ and $u \in U$, where U is a given set in an arbitrary topological space, is an element $f(x, u) \in B_2$, which is assumed to be a continuous function and has a continuous derivative in the Frechet sense. It is assumed that for every control function $u(t)$ ($a \leq t \leq b$) the differential equation

$$\frac{dx(t)}{dt} = f(x(t), u(t)), \quad x(a) = x_0$$

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ACCESSION NR: AP4037551

describing the control process has a unique solution $x(t) \in B_1$. The problem of selecting the control function $u(t)$ so that $x(b) \in M$ (where M is a given set in the space B_1) and the value of the functional

$$\int_a^b f(x(t), u(t)) dt$$

will be minimal is studied for the case when B_1 and B_2 are infinite dimensional spaces. It is shown that generally the maximum principle of Pontryagin cannot be applied to this case. Additional conditions are studied in which necessary optimality conditions in the form of Pontryagin's maximum principle are valid. Additional conditions are established for the optimal control of the following processes: 1) with the final state $x(b)$ fixed, 2) with the final state $x(b)$ located on the smooth manifold Σ of the space B_1 (the problem with sliding ends), and 3) with the final state $x(b)$ given approximately. The results obtained are applied to the study of control processes described by partial differential equations. The existence and

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